Abstract Preview

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Maternal genetic variation in inflammatory response genes interact with a measure of air pollution exposure to influence infant birthweight in non-Hispanic black women

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OBJECTIVE: To evaluate the contribution of maternal genetic variation and a measure of air pollution exposure to infant birthweight (BWT) among non-Hispanic black (NHB) women. METHODS: Healthy Pregnancy, Healthy Baby is a prospective cohort of pregnant women aimed at identifying genetic, social, and environmental contributors to racial disparities in pregnancy outcomes. English-literate women >18 yrs with a normal singleton pregnancy residing within Durham County, NC were enrolled prior to 28 weeks gestation. 673 NHB women were examined for BWT in this analysis. Maternal samples collected during inpatient admission for delivery were genotyped. Maternal residential address at enrollment was georeferenced and the distance to the nearest major roadway was calculated as a proxy for exposure to traffic-related air pollution. Haplotype tagging single nucleotide polymorphisms (htSNPs) were genotyped for 105 SNPs in 20 candidate genes using Taqman assays from Applied Biosystems Incorporated. Linear regression was used to examine the relationship between htSNPs and infant BWT, adjusting for parity, infant sex, maternal age, education, insurance, and smoking status. We also examined potential interactions between htSNPs and roadway proximity. RESULTS: Mean infant BWT was 3025 g (sd=653 g). Nominal evidence for main effects on infant BWT was detected with *CR1* (rs17047661, p=0.006), *IL10* (rs1518111, p=0.008), 2 SNPs in *IL8* (rs2227538, p=0.01; rs2227306, p=0.02), *IL12B* (rs2853694, p=0.03), *IL6* (rs2069840, p=0.03) and *IL12A* (rs568408, p=0.04). Evidence for SNPs interacting with roadway proximity to influence BWT was detected with two SNPs in *TLR4* (rs12344353, p=0.01; rs5030725, p=0.03), two SNPs in *IL4* (rs2227282, p=0.008; rs2243283, p=0.03) and one SNP in *INFG* (rs2069714, p=0.04). CONCLUSIONS: Similar to previous reports, genetic variation in inflammatory response genes provided evidence for main effects on infant BWT among NHB women in our study. Moreover, we provide the first evidence that some of these genes interact with air pollution exposure to influence infant BWT. Thus, maternal inflammatory response may be exacerbated by oxidative stress and particulate contamination due to exposure to air pollution during pregnancy.

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